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SELF-MEDICATION PRACTICES IN INDIA: TRENDS, DETERMINANTS, RISKS, AND THE EMERGING ROLE OF ARTIFICIAL INTELLIGENCE

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ABSTRACT

Self-medication is a widely practiced healthcare behaviour in India, particularly for the management of minor and self-limiting illnesses. While it offers benefits such as rapid symptom relief, reduced healthcare costs, and decreased burden on healthcare facilities, inappropriate and unregulated use poses significant public-health challenges. This review aims to provide a comprehensive overview of the prevalence, determinants, patterns, advantages, risks, and public-health implications of self-medication in India, with special emphasis on the emerging influence of artificial intelligence (AI) and digital health platforms. A narrative review of literature published till date was conducted using data from the World Health Organization, national health agencies, and peer-reviewed journals, along with findings from a recent rural-based study in Tamil Nadu. Evidence indicates that self-medication prevalence in India ranges from 30% to 80%, with common indications including cold, cough, fever, and headache. Analgesics and antibiotics are among the most frequently used drugs, with antibiotic misuse contributing significantly to antimicrobial resistance. Key drivers include perceived mildness of illness, cost constraints, time-saving behaviour, easy access to medicines, and increasing reliance on digital platforms such as search engines and AI tools. Major challenges include lack of awareness, weak regulatory enforcement, misinformation, and healthcare accessibility gaps. Strategies to ensure safe self-medication include strengthening drug regulations, enhancing public awareness, integrating pharmacists into primary care, regulating digital health tools, and improving healthcare infrastructure. Promoting responsible self-medication through a balanced approach is essential to reduce preventable morbidity and improve health outcomes in India.

KEYWORDS: Self-medication; Public health; Antimicrobial resistance; Artificial intelligence; Drug safety; Health literacy.

1. INTRODUCTION

1.1 Definition of self-medication: Self-medication refers to the use of medicines by individuals to treat self-recognized illnesses or symptoms without professional medical supervision. It also includes the continued or intermittent use of previously prescribed drugs for chronic or recurring conditions [2]. Responsible self-medication involves the appropriate use of over-the-counter (OTC) medicines that are safe and effective when used according to recommended guidelines [3].

1.2 Concept and scope of self-medication in public health: Self-medication is a widespread global phenomenon influenced by accessibility to medicines, socio-economic conditions, and healthcare infrastructure, with a significant proportion of the population, particularly in low- and middle-income countries, relying on self-treatment due to limited access to formal healthcare services [4]. It has increasingly been recognized as an important public-health concern, as highlighted by [3], who reported that while self-medication can support responsible self-care, its inappropriate use is associated with risks such as adverse drug reactions and misdiagnosis. More recent evidence indicates that the prevalence of self-medication has further increased globally due to improved availability of medicines, evolving patient behaviour, and widespread access to health information through digital platforms [4]. In the Indian context, self-medication is driven by multiple socio-economic and healthcare-related factors; a review by [5] reported a high prevalence across different population groups, emphasizing the roles of accessibility, affordability, and lack of awareness, while other studies suggest that inadequate regulation of over-the-counter drug sales and increased reliance on pharmacies significantly contribute to the widespread practice of self-medication in India [6].

1.3 Global and Indian burden of self-medication: Self-medication contributes significantly to both healthcare accessibility and public health risks. Globally, it is estimated that approximately 20–50% of individuals engage in self-medication practices, depending on region and population characteristics [4]. While it provides quick relief and reduces healthcare burden, irrational use of medicines remains a major concern.

1.4 Drivers of self-medication in India: Multiple factors contribute to the increasing prevalence of self-medication in India, reflecting a combination of individual perceptions, economic considerations, and healthcare accessibility challenges. A key driver is the

perceived mildness of illness, where individuals consider common conditions such as fever, headache, and cold to be non-serious and manageable without professional consultation. The base study indicates that approximately 43% of individuals engage in self-medication for this reason, while urgency (22.1%) and cost-saving behaviour (19.8%) are also significant contributors [1]. Economic constraints, including high out-of-pocket healthcare expenditure, further encourage individuals to opt for self-treatment [8]. Additionally, easy accessibility of medicines, particularly through pharmacies with weak enforcement of prescription regulations, plays a crucial role [10].

The rapid growth of digital health platforms and artificial intelligence (AI) tools has further accelerated this trend. Individuals increasingly rely on search engines, mobile applications, and AI-based systems to obtain medical information, often substituting professional consultation with digital advice. While these technologies improve accessibility and convenience, they also raise concerns regarding accuracy and safe medication practices [11,14].

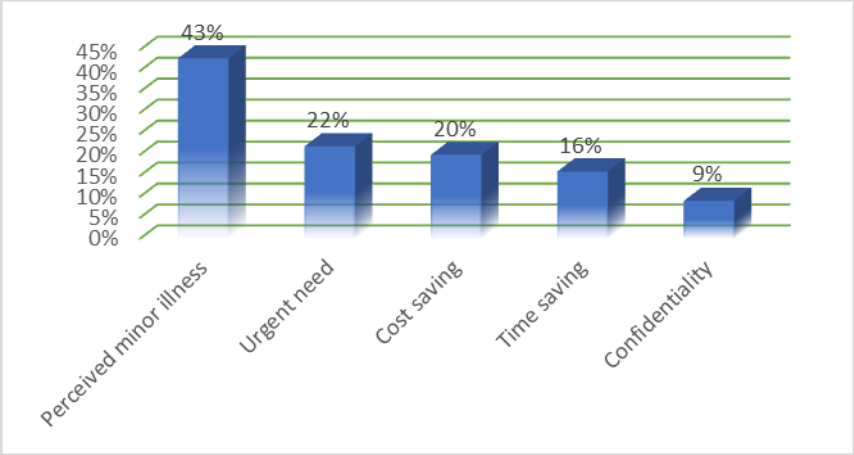

Figure 1: Key drivers of self-medication in India (Source: [1])

1.5 Role of artificial intelligence (AI) and digital platforms: The integration of artificial intelligence in healthcare has significantly influenced self-medication practices. AI-powered tools, mobile applications, and search engines provide instant access to drug information, symptom checkers, and treatment suggestions. According to the base study, Google (60.1%) and AI platforms such as ChatGPT (17.7%) are commonly used sources for self-medication-related information. While these technologies improve accessibility and convenience, they also pose risks due to misinformation, lack of clinical validation, and absence of personalized medical evaluation. Over-reliance on such platforms can lead to inappropriate drug use and delayed medical consultation [11,14,1].

1.6 Need for the present review: Despite increasing awareness, self-medication remains a major public health concern due to its dual nature, offering benefits when practiced responsibly but posing significant risks when misused. The rising influence of AI, increasing antibiotic misuse, and lack of regulatory control in India necessitate a comprehensive evaluation of this practice. Therefore, the present review aims to provide a national-level overview of self-medication practices in India, including prevalence, determinants, benefits, risks, and the emerging role of artificial intelligence, along with strategies to ensure safe and rational use of medicines.

These findings, along with emerging evidence on the role of artificial intelligence and digital health platforms, highlight the evolving nature of self-medication practices and the need for comprehensive evaluation in the Indian context [3,15,11,14,7,1].

2. Prevalence and Patterns of self-medication in India

2.1 Prevalence of self-medication in India: Self-medication is highly prevalent in India and represents a significant component of healthcare-seeking behaviour, particularly for the management of minor ailments, with reported prevalence rates ranging from 30% to 80% depending on population characteristics, study design, and accessibility to healthcare services [6,5]. Higher prevalence is commonly observed among urban populations, students, and working professionals due to time constraints and easy access to pharmacies. National-level evidence further supports the widespread practice of self-medication, as the Indian Council of Medical Research has reported that irrational use of antibiotics in community settings is a growing concern contributing significantly to antimicrobial resistance in the country [7]. Additionally, reports from the Ministry of Health and Family Welfare indicate that the easy availability of medicines, particularly in the private sector, facilitates unsupervised drug consumption and self-treatment practices [8]. Furthermore, data from the National Crime Records Bureau reveal a considerable number of poisoning and drug-related incidents, many of which are associated with improper medication use and lack of awareness regarding drug safety [9]. These findings collectively demonstrate that self-medication is not only highly prevalent in India but also associated with important safety concerns at the national level.

2.2 Common conditions leading to self-medication: Self-medication is most commonly practiced for minor and self-limiting conditions. Across India, ailments such as cold, cough, fever, headache, and gastrointestinal disturbances are the primary reasons for unsupervised drug use. The base article highlights that cold and cough (65.7%), headache (40%), and fever (34.3%) are the most common conditions for which individuals practice self-medication.

These findings are consistent with other Indian studies, indicating that individuals often perceive these conditions as non-serious and manageable without professional consultation [1,5,6].

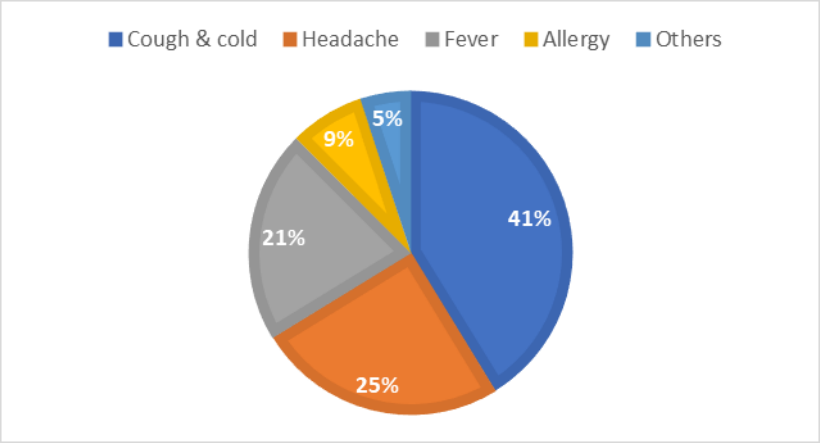

Figure 2: Common conditions for self-medication. (Source: [1])

2.3 Commonly used drug categories: The pattern of drug use in self-medication reflects the nature of illnesses being treated. Analgesics, antipyretics, antibiotics, and cough preparations are among the most commonly used drug classes in India. According to the base study, painkillers (46.3%), antibiotics (42.6%), and cough syrups (22.7%) are frequently used without prescription. The widespread use of antibiotics without medical supervision is particularly concerning due to its contribution to antimicrobial resistance (AMR), a major global health threat [10].

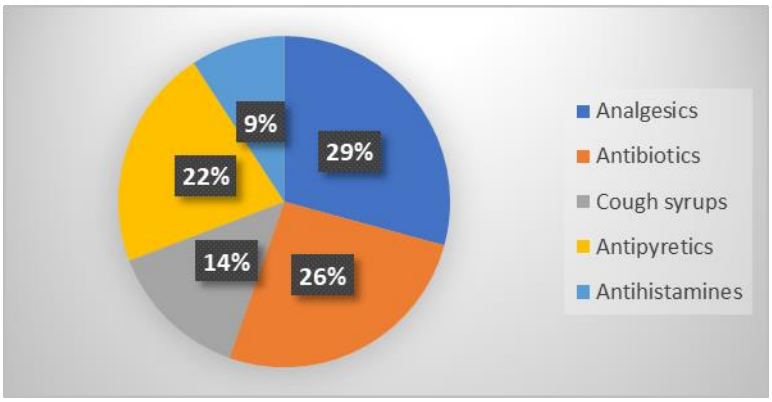

Figure 3: Common drug categories used in self-medication ((Source: [1] and Indian literature)

2.4 Sources of information for self-medication: The choice of medication in self-medication is largely influenced by easily accessible information sources. Traditionally,

pharmacists, family members, and previous prescriptions were the main sources. However, the growing penetration of digital technologies has significantly changed this pattern. The base study reveals that Google (60.1%) and AI platforms such as ChatGPT (17.7%) are commonly used sources of medical information. This reflects a shift toward digital self-care, where individuals increasingly rely on online platforms for diagnosis and treatment decisions [5,3,11,14,1].

2.5 Patterns of drug use behaviour: Self-medication behaviour in India often includes practices such as reuse of old prescriptions, incomplete dosage regimens, and sharing of medicines among family members. Such patterns increase the risk of treatment failure, adverse drug reactions, and development of drug resistance. The base study indicates that a proportion of individuals alter dosage or discontinue medication once symptoms improve, highlighting gaps in awareness regarding rational drug use. These findings align with previous research emphasizing irrational drug use as a major concern in developing countries [3].

2.6 Rural–urban differences in self-medication: There are notable differences in self-medication practices between rural and urban populations. Urban populations tend to rely more on digital platforms and pharmacies, while rural populations depend more on informal healthcare providers and traditional practices. However, with increasing internet penetration, rural populations are also adopting digital health tools, as reflected in the base study conducted in rural Tamil Nadu. Despite this shift, challenges such as limited health literacy and access to trained professionals remain significant in rural areas [5,15,11,1].

2.7 Public health implications of current patterns: The widespread prevalence and patterns of self-medication in India have important public health implications. While self-medication can reduce the burden on healthcare systems for minor illnesses, irrational use, especially of antibiotics, contributes to serious issues such as antimicrobial resistance, increased healthcare costs, and adverse drug reactions. The increasing influence of digital platforms further complicates this scenario by enabling easy access to unverified medical information. Therefore, understanding these patterns is crucial for designing effective interventions and regulatory policies [3,15,7,4,14].

3. Determinants and drivers of self-medication in India

Self-medication practices in India are influenced by a complex interplay of socio-demographic, economic, healthcare-system, and behavioural factors. A major driver is the perceived severity of illness, where individuals consider conditions such as fever, headache,

and cold to be minor and manageable without professional consultation [3,5]. Economic constraints, particularly high out-of-pocket healthcare expenditure, further encourage self-medication as a cost-saving alternative [8].

Time constraints and convenience, especially among urban populations, also play a significant role, as individuals seek quick relief without waiting for medical appointments [4]. Easy accessibility of medicines, including prescription drugs due to weak regulatory enforcement, remains another critical determinant contributing to irrational drug use [10].

Additionally, pharmacists, informal healthcare providers, and sociocultural influences such as family practices and sharing of medicines significantly shape self-medication behaviour, particularly in rural and semi-urban settings [6]. The rapid growth of digital platforms and artificial intelligence (AI) tools has further transformed decision-making by providing instant access to health information; however, this also introduces risks related to misinformation and lack of clinical validation [11,14].

Healthcare system gaps, including limited access to facilities, shortage of trained professionals, and overcrowding in public hospitals, further drive reliance on self-medication [17]. Overall, these determinants highlight the need for targeted interventions focusing on regulation, awareness, and improved healthcare accessibility.

Table 1: Major determinants of self-medication in India (Source: [3,6,10] and other relevant studies).

Category	Key factors
Individual factors	Perceived minor illness, prior experience
Economic factors	Cost-saving, high out-of-pocket expenses
System factors	Limited healthcare access, long waiting times
Accessibility	Easy availability of medicines
Technological	Internet, AI tools, online pharmacies
Sociocultural	Family influence, traditional practices

4. Influence of artificial intelligence and digital platforms on self-medication

The rapid growth of digital technologies, particularly artificial intelligence (AI), has significantly influenced self-medication practices in India by enabling easy access to health information through search engines, mobile applications, and AI-based tools [11]. These platforms promote convenience, improve accessibility, and support self-directed care, especially in underserved areas. However, their use also poses risks, including misinformation, lack of clinical judgment, over-reliance on digital advice, and delayed medical consultation [14]. In addition, inappropriate use of online health information can

contribute to irrational drug use, particularly antibiotics, thereby increasing the risk of antimicrobial resistance [10].

The lack of strong regulatory frameworks for digital health platforms further exacerbates these concerns. Therefore, effective governance, validation of AI-based tools, and public awareness are essential to ensure safe and responsible use. A balanced approach integrating digital technologies with formal healthcare systems is crucial to maximize benefits while minimizing risks.

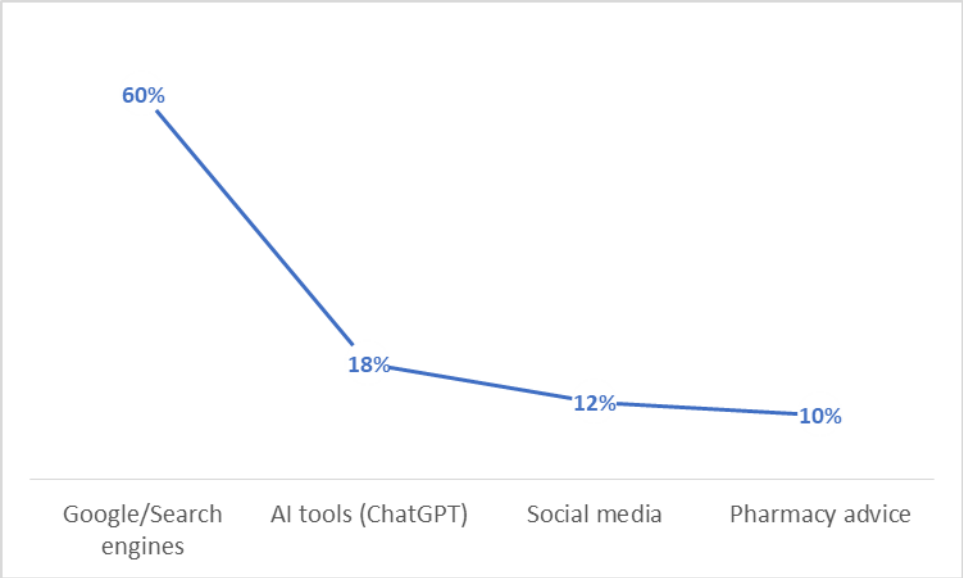

Figure 4: Digital sources influencing self-medication (Source: [1])

5. Merits and demerits of self-medication

Self-medication is a double-edged practice with both beneficial and harmful implications for individuals and public health. When practiced responsibly, it offers advantages such as rapid relief for minor ailments, cost-effectiveness, convenience, and reduced burden on healthcare systems, while also promoting self-care and patient empowerment [3]. However, irrational and unsupervised use poses significant risks, including misdiagnosis, adverse drug reactions, incorrect dosage, drug interactions, and potential drug dependence.

A major concern is the misuse of antibiotics, which contributes to antimicrobial resistance, a critical global health threat [10]. Additionally, increasing reliance on digital platforms may expose individuals to misinformation, leading to inappropriate drug use and delayed medical consultation [14].

From a public health perspective, balancing the benefits and risks of self-medication requires improved awareness, stronger regulatory frameworks, and integration of self-care practices with formal healthcare systems.

5.4 Comparative analysis of merits and demerits

Table 2: Merits versus demerits of self-medication. (Source: [3])

Merits	Demerits
Quick relief from minor ailments	Risk of misdiagnosis
Cost-effective	Adverse drug reactions
Reduces healthcare burden	Antibiotic resistance
Convenient and time-saving	Drug interactions
Promotes self-care	Incorrect dosage and misuse
Accessible in remote areas	Delay in seeking medical care

6. Public health impact and challenges of self-medication in India

Self-medication has significant public health implications in India, influencing disease outcomes, healthcare utilization, and long-term system sustainability. While responsible use may support primary healthcare, irrational practices contribute to adverse drug reactions, delayed diagnosis, and increased morbidity. A major concern is the widespread misuse of antibiotics, which accelerates antimicrobial resistance (AMR), now recognized as a critical global health threat [10]. In India, high levels of antibiotic self-medication further exacerbate this problem.

Additionally, inappropriate drug use, incorrect dosing, and polypharmacy increase the risk of toxicity and treatment failure. Self-medication also leads to delays in seeking professional care, particularly in infections and chronic diseases, resulting in complications and higher healthcare costs. Although it may reduce immediate expenses, long-term economic burden increases due to hospitalizations and drug-resistant infections.

Healthcare system limitations, such as poor accessibility, shortage of professionals, and weak regulatory enforcement, further drive this practice. The growing influence of digital platforms introduces additional risks of misinformation and inappropriate drug use.

Overall, addressing these challenges requires strengthening regulation, improving health literacy, enhancing primary healthcare access, and ensuring responsible use of digital health technologies [2].

Self-medication

↓

Incorrect antibiotic use

↓

Incomplete treatment

↓

Resistance development

↓

Treatment failure

↓

Increased healthcare burden

Figure 5: Schematic representation of the pathway linking self-medication to antimicrobial resistance and increased healthcare burden. (Source: [10])

Table 3: Public health challenges of self-medication in India (Source: [10,3,8] and related literature.)

Challenge	**Impact**
Antibiotic misuse	Antimicrobial resistance
Adverse drug reactions	Increased morbidity
Delayed diagnosis	Disease progression
Easy drug availability	Irrational drug use
Digital misinformation	Incorrect treatment decisions
Healthcare access gaps	Increased reliance on self-medication

7. Strategies and recommendations to ensure safe self-medication in India

Ensuring safe self-medication in India requires a coordinated, multi-level approach addressing regulatory, educational, and healthcare system gaps. Strengthening drug regulation and enforcing prescription policies are essential to prevent misuse of antibiotics and high-risk medicines [2]. Improving public awareness and health literacy through community programs, school education, and digital platforms can further promote rational drug use.

Pharmacists should play an active role in patient counselling and responsible dispensing, while strengthening primary healthcare infrastructure and improving access to essential medicines can reduce dependence on self-medication. With the increasing use of digital platforms, regulation and validation of AI-based health tools are necessary to ensure reliable information and prevent misuse [11].

Promoting responsible self-medication for minor ailments, along with strict measures to control antibiotic misuse, is critical to addressing antimicrobial resistance [10]. Community-based interventions and continuous monitoring of drug use patterns are also essential. Overall, an integrated strategy combining regulation, education, healthcare access, and digital governance is key to ensuring safe and rational self-medication practices.

Table 4: Summary of strategies to improve safe self-medication (Source: [10,16,8] and related literature)

Area	Key strategies
Regulation	Enforce drug laws, control antibiotic sales
Awareness	Public education, school programs
Healthcare system	Strengthen PHCs, improve access
Pharmacists	Counselling and responsible dispensing
Digital health	Regulation of AI tools, verified platforms
Community	Training and outreach programs
Monitoring	Surveys, audits, surveillance

8. CONCLUSION AND FUTURE DIRECTIONS

Self-medication has become a widespread component of healthcare practice in India, particularly for managing minor illnesses. While it offers advantages such as rapid relief, cost-effectiveness, and reduced burden on healthcare systems, its irrational use poses significant public health risks, including misdiagnosis, adverse drug reactions, and antimicrobial resistance. The growing influence of digital platforms and artificial intelligence has further transformed self-medication by improving access to health information; however, concerns regarding misinformation, lack of clinical validation, and delayed medical consultation remain.

From a public health perspective, the focus should be on promoting responsible self-medication rather than eliminating it. Strengthening regulatory frameworks, improving health literacy, and enhancing access to primary healthcare services are essential strategies to minimize risks and maximize benefits. Future efforts should emphasize large-scale research on self-medication patterns, regulation of digital health tools, rational use of medicines, and community-based awareness programs.

Overall, a balanced approach integrating education, regulation, healthcare system strengthening, and responsible use of digital technologies is necessary to ensure safe self-medication practices and reduce preventable morbidity and mortality.

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Limitations: This review is based on secondary data from published literature and may be subject to publication bias. The findings may not fully represent regional variations across India. Additionally, the rapidly evolving nature of digital health technologies and artificial intelligence may limit the generalizability of certain observations.

Conflict of Interest: The authors declare no conflict of interest.

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